Hazardous Waste Management in Gujarat

By
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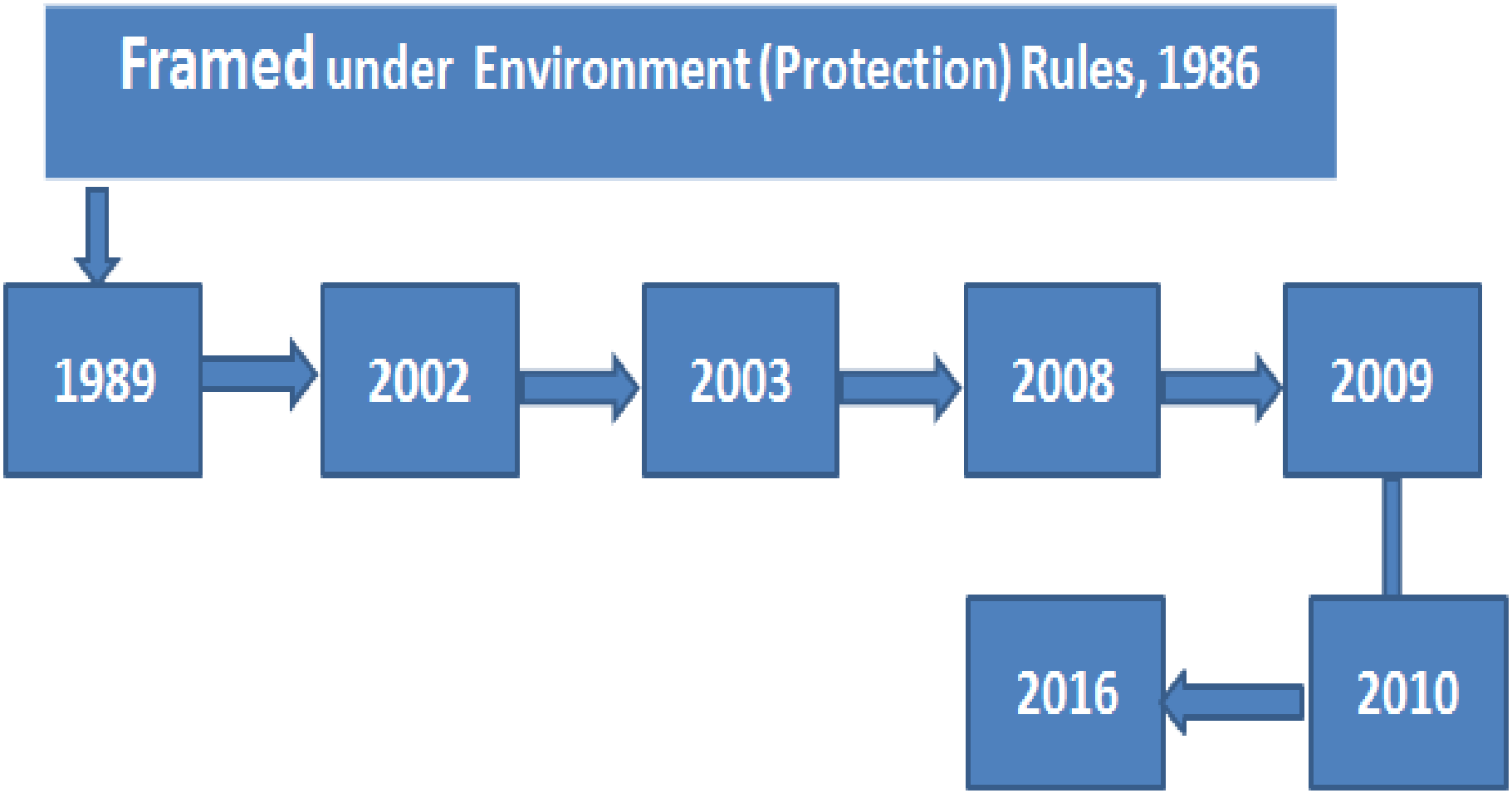
Hazardous Waste Rules & its Amendments

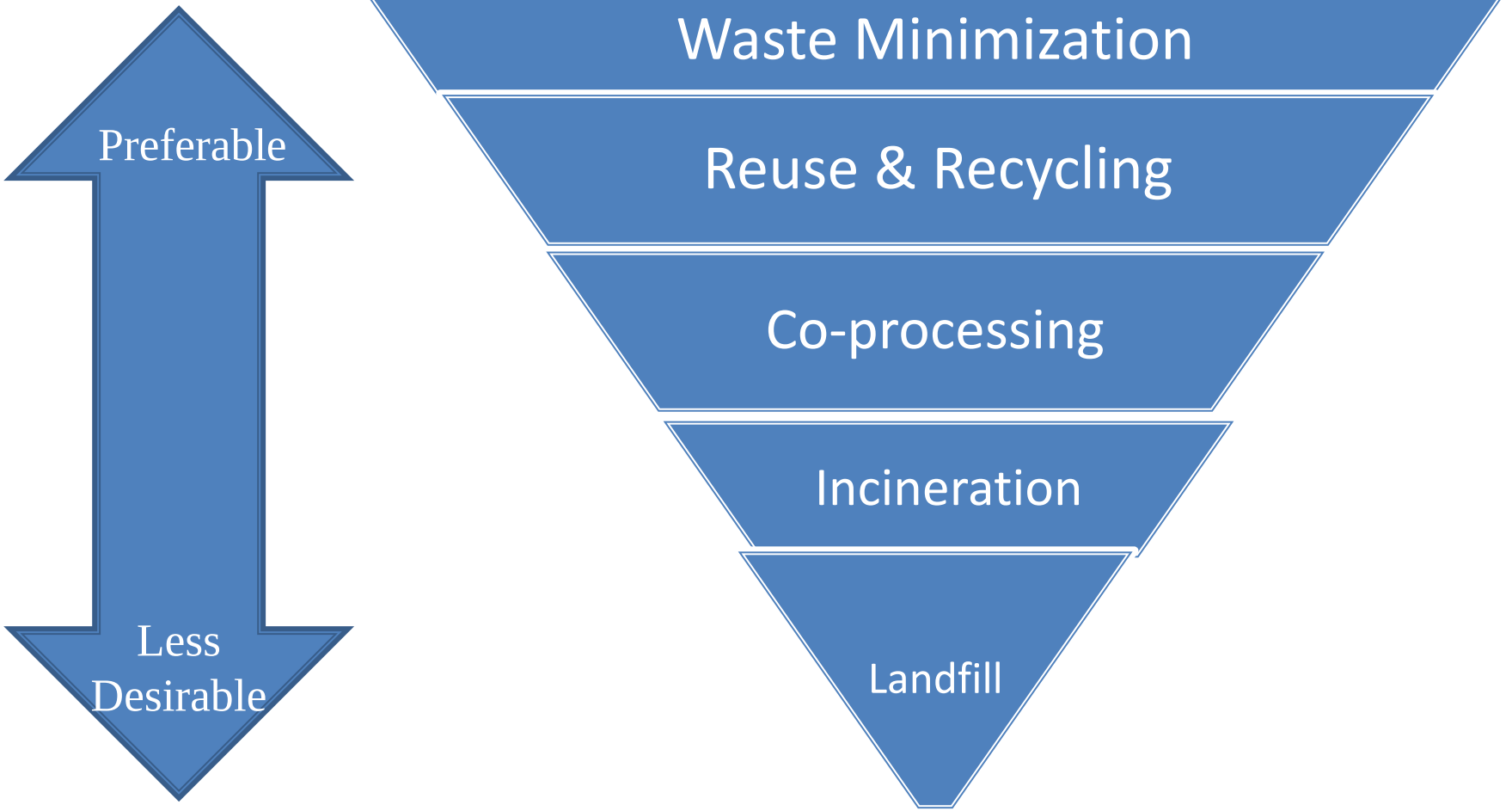


Hazardous Waste

- Any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances, and shall include -

Schedule-I 38 sector Specified industrial Waste Total 128 types of hazardous waste	Schedule-II Class A -Based on leachable concentration Class B &C- characteristics	Schedule-III For Import -Export	Schedule-IV Commonly recyclable waste

Waste Management Hierarchy



Waste disposal methods

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Landfill	▪Least preferable option ▪Landfill requires huge maintenance and land ▪Poorly designed landfills have risk of groundwater and soil pollution ▪ Loss of land, land availability constraint ▪Landfill Gases could lead to various health problems
Incineration	▪It require high temperature and energy ▪ Leads to Air Pollution ▪Residues are generated in form of Incineraion ash , which is required to be disposed into landfills ▪ High Maintenance cost
Recycling Reuse	▪ Reduces the amount of waste sent to landfills and incinerators ▪Conservation of energy and own resources
Co-processing	▪Means the use of waste in the cement kiln either as fuel or for the purpose of energy or resource recovery or both ▪Complete destruction of pollutants in high temperature (1400 °C) ▪ No residues are left, ▪ Saving the national resources ▪Reduces burden on landfills

Hazardous Waste Management
Gujarat Scenario

Sr No	Waste Disposal Methodology	Details of waste management facilities in Gujarat
1.	Recycling	About 475 actual users/recyclers authorized by the Board
2.	Co-processing	12 Cement industries + 6 pre-processing facilities
3.	Incineration	5 in operation
4.	TSDF (land filling)	7 in operation

Hazardous Waste Management Facilities in Gujarat

HW generation data

Sr. No.	Type Of waste	2017-18	2018-19	2019-20
1	Landfillable	9,65,358 MT	9,93,919 MT	9,82,979 MT
2	Incinerable	91,662 MT	81,182 MT	1,55,218 MT
3	Co-Processing	8,33,377 MT	6,42,963 MT	7,93,612 MT
4	Recyclable	1,75,205 MT	6,36,547 MT	5,53,507 MT
5	**Total waste Generation**	**20,65,602 MT**	**23,54,611 MT**	**24,85,316 MT**

Responsibilities of SPCBs

- **Grant and Renewal of authorisation under Rule: 6 & 9**
- Monitoring of compliance of various provisions and conditions of authorisation
- **Action against violations of these rules**
- Implementation of **programmes to prevent or reduce or minimise the generation of hazardous and other wastes**
- One time authorization for import of other wastes of Schedule-III, Part-D
- Preparation & Submission of Annual Inventory Reports to CPCB
- Submit progress report / Action taken reports to CPCB in various matters

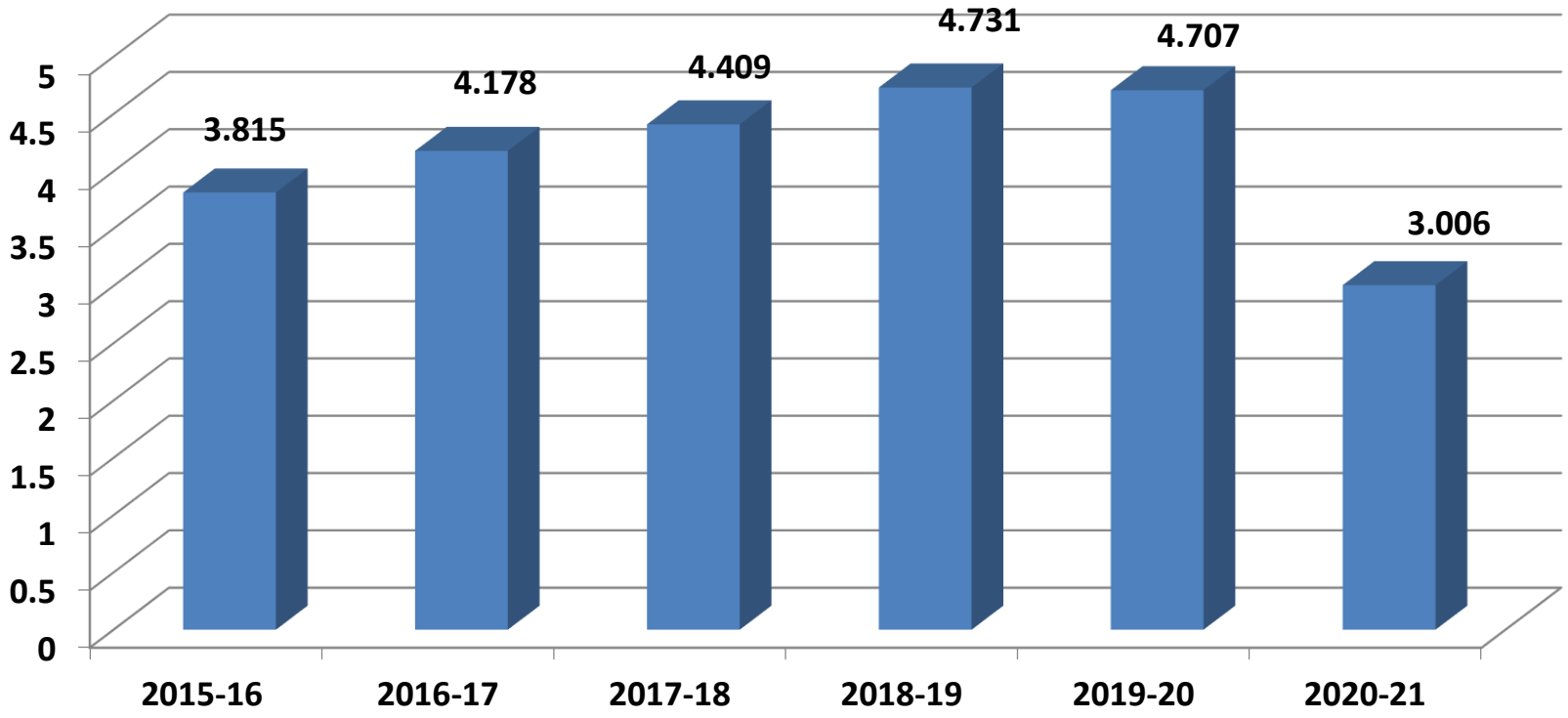
Co-processing

- **Definition**: Co-processing is the use of waste as raw material, or as a source of energy or both to replace natural mineral resources and fossil fuels such as coal, petroleum, gas mainly in energy intensive industries like cement, lime, steel, glass and power generation.

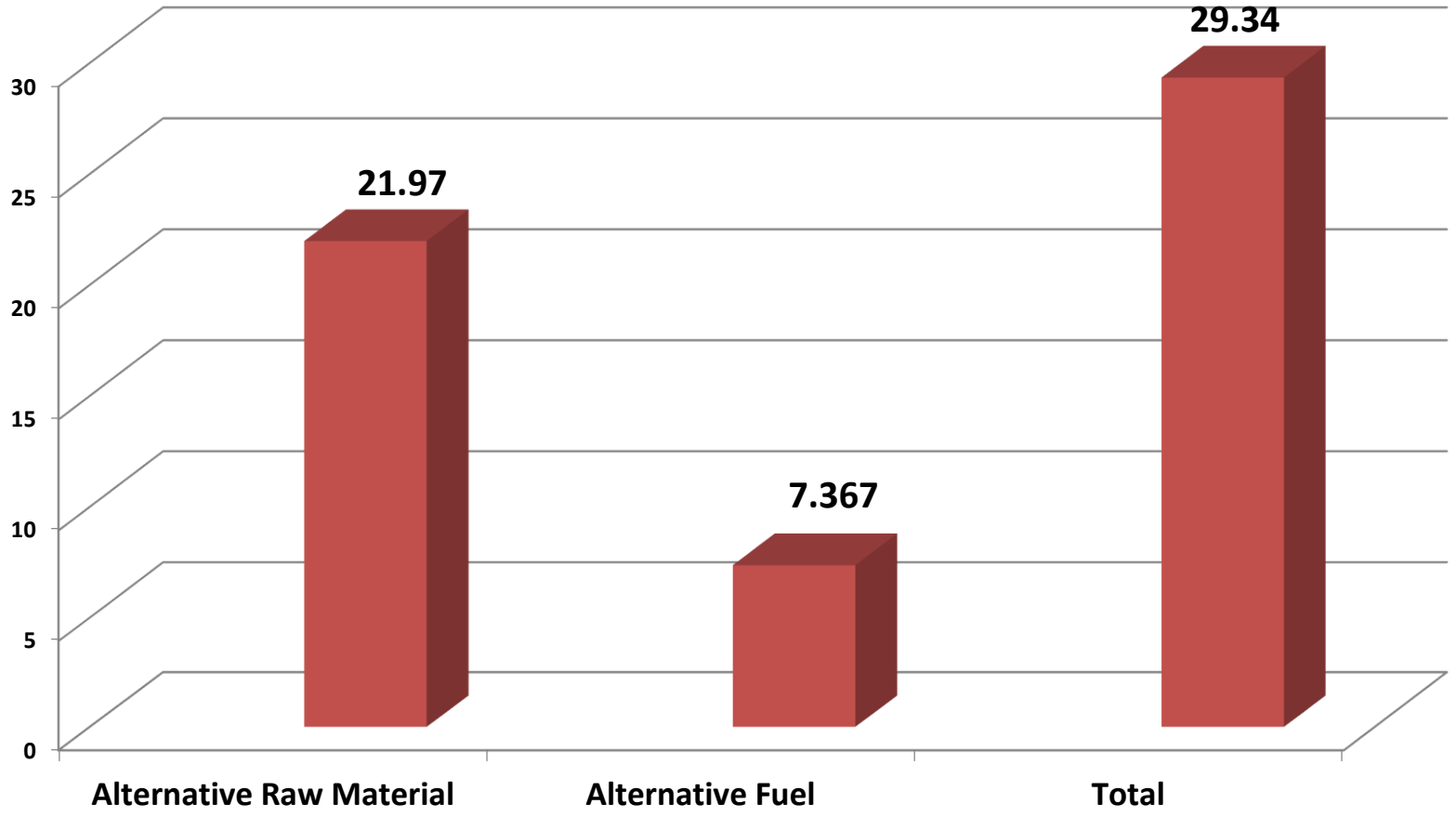
- Waste materials used for co-processing are referred as AFR i.e. Alternative Fuel and Raw material

Waste co-processed

Waste Co-processed in Cement Industries



Alternate Fuel & RM analysis of Co-Processed Waste from 2009 to Mar-21 (in Million MT)



About Online Manifest System

- GPCB - Hazardous Waste Cell has strengthened online manifest system for transportation of Hazardous waste.
- It is operational **since 26/02/2020**
- Daily about **500-600 manifests** are generated in the state by this online system.
- Sender of hazardous waste is required to generate online manifest on XGN (Xtended Green Node).
- **In case on recycling, prior in-principle approval of actual user on online system is mandatory.**
- **Receiver is required to verify waste details with sender's detail & insert on XGN while receiving waste to prevent any mismatch.**

Salient Features- Online Manifest System

- Movement of hazardous waste intended for Landfill, Incineration, Recycling, Pre-Processing, Co-Processing can be tracked.
- Prior in principle approval of actual user on online system is mandatory for recycling of hazardous waste.
- Menu driven, user friendly form filling
- Precise database of waste generation in the state can be found.
- Inventory of the waste generation will be strengthened.
- Helpful in tracking of the waste in the case of illegal movement of the waste and to find defaulter.
- Closed loop system
- Flexibility in the system will facilitate actual user.
- Promote Recycle, Reuse of the waste

Summary of Manifest Generated in The Gujarat State

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:: Haz Manifest MIS Report ::

Waste Intended for:	Land fill	Disposal State :	Gujarat	Waste Disposal Mode :	Common TSDF	Vehicle Type :	Select
Schedule :	Select	Category :		Waste Name :		Consistency :	Select
Sender PCB ID :		Receiver PCB ID		RO Circle:	SELECT	Manifest Status :	All
By Manifest Freez Date / By Manifest Recieved Date		From Date :	25/05/2020	To Date :	26/05/2020	Go	Export To Excel

Colour Description

1.Draft -White :0 | 2.Pending For In Principle Approval -Blue :0 | 3. [illegible]nsit (Freezed/Not Freezed)-Yellow : 0 | 4.Recieved - Green :518 | 5. Rejection -Red :3

Sr.No	Manifest ID	Receiver Details	Sender Details	Schedule-Category-WasteName	Waste Qty	Is Accept	Is Recieved	Received Qty	Freez	Report
1	1077288	22333~Nandesari Environment Control Ltd , TSDF/CHWI~GIDC NANDASARI,- Taluka :VAD Distict:VAD Pin no:391340	24162~Farmson Pharmaceuticals Gujarat Pvt. Ltd.~GIDC Nandesari, Taluka :VAD	I-35-35.3~Chemical sludge from waste	3.600 MT	Yes	Yes	3.525 MT	Freezed-26/05/2020	Print
2	1077218	22333~Nandesari Environment Control Ltd , TSDF/CHWI~GIDC NANDASARI,- Taluka :VAD Distict:VAD Pin no:391340	21999~Gulbrandsen Chemical Pvt. Ltd.,~VILL: MUJPUR,,Also s.nos. 326, 200 and 199, ON COASTAL HIGHWAY Taluka :PAD Distict:VAD Pin no:391440	I-35-35.3~Chemical sludge from waste water treatment	3.320 MT	Yes	Yes	3.305 MT	Freezed-26/05/2020	Print
3	1077188	22333~Nandesari Environment Control Ltd , TSDF/CHWI~GIDC NANDASARI,- Taluka :VAD Distict:VAD Pin no:391340	21875~Vadodara Enviro Channel Ltd -VECL , (formerly ECP)~VILL : DHANORA,(PO) PETROFILS Taluka :VAD Distict:VAD Pin no:391346	I-35-35.3~Chemical sludge from waste water treatment	3.400 MT	Yes	Yes	3.355 MT	Freezed-26/05/2020	Print
4	1077187	22333~Nandesari Environment Control Ltd , TSDF/CHWI~GIDC NANDASARI,- Taluka :VAD Distict:VAD Pin no:391340	21875~Vadodara Enviro Channel Ltd -VECL , (formerly ECP)~VILL : DHANORA,(PO) PETROFILS Taluka :VAD Distict:VAD Pin no:391346	I-35-35.3~Chemical sludge from waste water treatment	3.400 MT	Yes	Yes	3.670 MT	Freezed-26/05/2020	Print
5	1077182	22333~Nandesari Environment Control Ltd , TSDF/CHWI~GIDC NANDASARI,- Taluka :VAD Distict:VAD Pin no:391340	21875~Vadodara Enviro Channel Ltd -VECL , (formerly ECP)~VILL : DHANORA,(PO) PETROFILS Taluka :VAD Distict:VAD Pin no:391346	I-35-35.3~Chemical sludge from waste water treatment	3.400 MT	Yes	Yes	3.580 MT	Freezed-26/05/2020	Print
6									Freezed-26/05/2020	Print
7	1077145	TSDF/CHWI~GIDC NANDASARI,- Taluka :VAD Distict:VAD Pin no:391340	no:391340	water treatment	MT	Yes	Yes	MT	Freezed-26/05/2020	Print
8	1077137	22333~Nandesari Environment Control Ltd , TSDF/CHWI~GIDC NANDASARI,- Taluka :VAD Distict:VAD	21636~Arihant Dyes & Chemicals~GIDC, Nandesari,- Taluka :VAD Distict:VAD Pin no:-391340	I-35-35.3~Chemical sludge from waste water treatment	3.200 MT	Yes	Yes	3.480 MT	Freezed-26/05/2020	Print

Filter data as per requirement to get desired details

NOTE: Derived result can be exported to excel sheet for ease of analysis by pressing “Export to Excel” button as shown in screen

March-2021

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Total Hazardous Waste Generation 352657 MT
11376 MT per Day

- TSDF 99686 MT (28.27%)
- Incineration 7213 MT (2.05%)
- Recycle 130014 MT (36.87%)
  - Recycle Gujarat 90604 MT (69.69%)
  - Recycle Out-state 39410 MT (30.31%)
- Co-Processing 98408 MT (27.9%)
- Pre-Processing 17336 MT (4.91%)

Rule-9 : Provision of Recycling and Utilization of HW

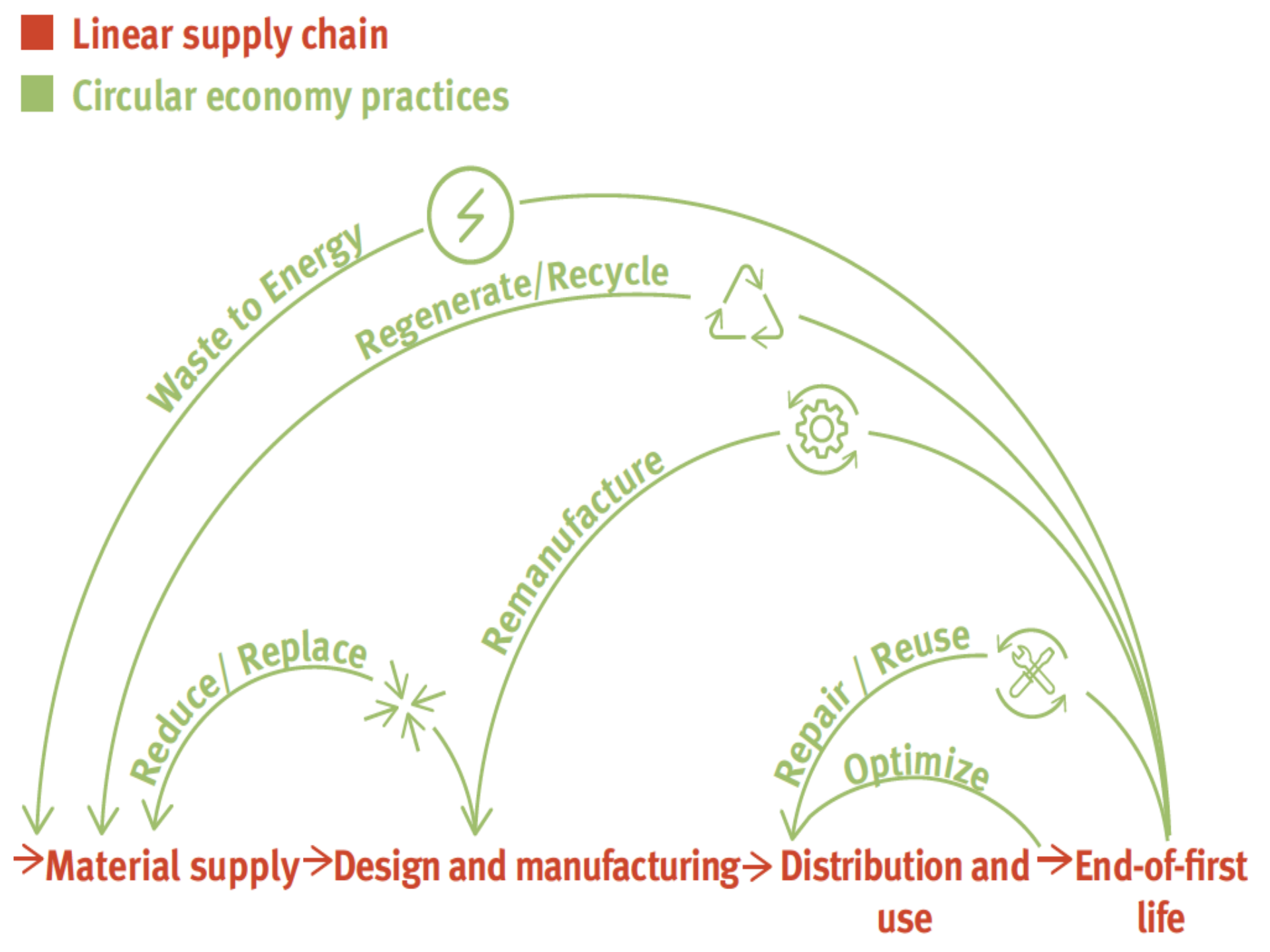
1. SPCBs/PCCS may grant authorisation to actual users for utilization or recycling of Hazardous Wastes for which Standard Operating Procedures (SoPs) or guidelines have been provided by CPCB
2. For specific utilization of hazardous and other waste for which SOP is not developed by CPCB, such application shall be routed to CPCB through SPCBs.

   Upon completion of successful trial run, CPCB shall prepare SoPs for such Utilization and circulate the same to all SPCBs
3. No trial runs are required for co-processing as co-processing standards are notified.

Efforts to expedite SOP preparation (Rule-9)

- **Gujarat is the only state where powers given by CPCB to prepare Draft SOP**
- Efforts made to **prepare generic SOPs under Rule-9** so it can be useful to major industrial sectors.
- About 35 Pre-meetings and 7 expert committee meetings have been arranged in last year.
- The pre-meetings are one-to-one meeting with generator and actual users so as to discuss process of utilization, to understand the source and characteristic of Hazardous waste etc.
- Board has issued about **26 trial runs** for preparation of draft SoPs , out of which 17 trial runs is issued within last six months which is useful for about 150 industries.
- **12 draft SOPs** prepared by GPCB is approved by CPCB till date
- To promote reuse-recycle of hazardous waste, Gujarat is the only state to prepare **Interim policy valid till January 2022** for industries which are conventionally using hazardous waste.


Reduce Environmental Footprint
Green products
non-toxic, long-life, recyclable
Cleaner production
using fewer resources
Generate Increased Income
Circular Economy
Recycle waste, reuse resources
Better service
to extend lifespan
Collect at end-of-life, remanufacture
Minimize Waste
Reduce Resource Dependency


Linear supply chain
Circular economy practices
Waste to Energy
Regenerate/Recycle
Remanufacture
Reduce/ Replace
Repair / Reuse
Optimize
Material supply
Design and manufacturing
Distribution and use
End-of-first life

Recycling, Reuse & Recovery

- **Recycling**: Reclamation and processing of hazardous or other wastes in an environmentally sound manner for the originally intended purpose or for other purposes.
- **Reuse**: Use of hazardous or other waste for the purpose of its original use or other use.
- **Recovery**: Any operation or activity wherein specific materials are recovered.

Success stories
"Know Your Waste"

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Identification of the waste suitable for co-processing

Inventory of Waste based on quality & characteristics

Integration with modern laboratory of the GPCB for testing of wastes

Testing of parameters relevant to co-processing

GCV, NCV, Chloride, Moisture,H.M., TOC etc.

All industries having total waste generation more than 10 TPA will be covered

Cleaner Production

- Cleaner Production means the continuous application of an integrated, preventative environmental strategy to processes, products and services to increase eco-efficiency and reduce risks to humans and the environment".

- CP is a general term that describes a preventive environmental approach, aimed at increasing resource efficiency and reducing the generation of pollution and waste at source, rather than addressing and mitigating just the symptoms by technically “treating” an existing waste/pollution problem. CP addresses the problem at several levels at once, serving as a holistic integrated preventive approach to environmental protection.

- In other words, CP avoids the end-of-pipe approach.

Success Stories

Novel Spent Acid Management Facility

- ✓ Common Spent Acid Management facility operational since December 2009
- ✓ Capacity: 2,70,000 MTPA
- ✓ Chemical Gypsum (80% Purity) is sent to Cement manufacturing units
- ✓ Facility having @ 50,000 MT of gypsum storage area for monsoon season.
- ✓ About 700 MT/day of spent acid is received form 207 member units.

Gypsum Storage Area – 50,000 MT

Automatic filtration unit

Success stories

- ✓ **Strengthening of SOP for Solvent Distillation Units:**

❖ SOP includes

a) Organized storage of waste

b) Automization in design with sensors

c) Online monitoring of pollutants

d) Standardization of EMS and safety aspects

- ✓ **Outcome**

(i) Reduction in accidents

(ii) Reduction in VOC emissions

(iii) Increase in yield/ recovery

(iv) Earlier unorganized sector has now become organized sector through environmentally sound practices

Photographs of Facilities

Photographs of VOC Meter

Use of wastes to control pollution- An Oxymoron in Environment Jargon

- Utilization of Spent Ammonium Carbonate as NO_X control agent
- Encourage the new technologies for pollution control
- Trial run to use Spent Ammonium Carbonate generating from CPC Blue manufacturing replacing Ammonia was conducted in Ambuja cement plant in May 2019.
- After successful trial utilization is going on since August 2019
- About MT Spent Ammonium Carbonate is utilized by Cement Industry

Benefits of using Ammonium Carbonate Solution over Liquor Ammonia

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- The use of Ammonium Carbonate **replaces the requirement of Ammonia gas**, which is **a major raw material** for most of the **fertilizers** ranging from urea to ammonium Sulphate to Ammonium Nitrate, DAP, MAP and many more.
- Ammonium Carbonate Solution is much more **safe to handle than Ammonia gas**.
- Ammonium Carbonate **Supplied is much more cheaper** than other sources of Ammonia like Ammonium Hydroxide, Anhydrous Ammonia, etc.
- Gujarat accounts for nearly 90-100% Ammonium Carbonate production. Thus, causing diversion of Ammonium Carbonate from Manufacturer to user to be at **a low transportation cost and again low carbon emission**

GREEN SOLVENTS

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- Solvents define a major part of the environmental performance and also impact on cost, safety and health issues
- "green" solvents expresses the goal to minimize the environmental impact resulting from the use of solvents in chemical production
- Green solvents are environmentally friendly solvents, or bio solvents, which are derived from the processing of agricultural crops.. Green solvents were developed as a more environmentally friendly alternative to petrochemical solvents
- for **example- Ethyl lactate, is** a green solvent derived from processing corn. Ethyl lactate is the ester of lactic acid. **Maionly used in the paints and coatings industry and have numerous attractive advantages including being 100% biodegradable, easy to recycle, noncorrosive, non carcinogenic, and nonozone-depleting**

Uses Of Green Solvents

- An ideal green solvent would also mediate reactions, separations or catalyst recycling
- Substitution of hazardous solvents with one that show better EHS (Environment, Health, Safety) properties such as increased biodegradability or reduced ozone depletion potential
- Use of “bio-solvents” i.e. solvents produced from renewable resources such as **ethanol produced by fermentation of sugar-containing feeds,** starchy feed materials or lignocellulose materials
- **Substitution of organic solvents with supercritical CO2 in polymer processing avoids** the use of chlorofluorocarbons, and reduces the ozone

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Thank you